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The World's Sugar Supply

Its Sources and Distribution

UNIVERSITY OF CALIFORNIA

National Bank of Commerce
in New York

December 1917

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Foreword

SUGAR is a commodity of daily use in every household of the United States. The shortage in the supply during recent weeks has hence made it a subject of keen and universal interest.

This pamphlet is published by the National Bank of Commerce in New York as part of the bank's effort to furnish in easily available form information on subjects of special and immediate significance to the industrial, commercial and financial community.

It is the second of a series dealing with commodities of special importance from the standpoint of foreign trade. The first of the series, entitled "Exports of Raw Cotton from the United States to the Leading European Neutrals, 1900–1917," appeared in September, 1917.

The Foreign Department of this Bank is in close touch with the rapid development which is now taking place in the foreign trade of the United States, and as data on other commodities are assembled, similar studies will appear.

This pamphlet has been sent to those to whom it is believed the subject will be of special interest. From those who care for additional information on this, or on other commodities of importance in the import and export field, correspondence is invited with the National Bank of Commerce in New York.

THE WORLD'S SUGAR SUPPLY
ITS SOURCES AND DISTRIBUTION

Introduction

LESS than three hundred years ago the great mass of the people had scarcely tasted sugar, while for the rich it was the rarest of luxuries, and was even esteemed as a medicine. To-day it is generally regarded as a necessity for happiness, if not for health.

Very seldom has it been possible to trace clearly the original home of any food staple, or to find the paths by which it was carried over the civilized world. This is the case with cane sugar. Here and there, in a chance allusion by some writer, we get a glimpse of the roads over which the knowledge of sugar came down to us, but these are only rare flashes at long intervals. Apparently Gangetic India had long known the sugar cane and the art of boiling sugar from it. The Chinese acquired the knowledge from India in the first half of the seventh century. However, sugar cane must have been grown in Egypt at the same time that its growth was developing in India, for it is known that the Chinese, in the Mongol period, acquired the art of sugar refining from Egyptian visitors. It was the Arabs, the transmitters of more than one priceless practical art, who finally brought the cultivation of the sugar cane to the knowledge of western Europe. They probably acquired the knowledge of its cultivation from the locality about Khuzistan, in Persia, and in the days of their westward march they carried it to Morocco and even into Spain.

In the days when Venice was the great port of the Adriatic, among the luxuries unloaded at her crowded docks was sugar. During the Middle Ages that city was the great European centre of the sugar trade. So im-

portant was sugar regarded by her merchants that toward the close of the fifteenth century a Venetian citizen received a reward of 100,000 crowns for the invention of the art of making loaf sugar. The world was willing to pay for sugar then as now, and Venetian merchants carried sugar out of the Mediterranean to the ports on the Atlantic. Sugar in fairly large quantities was beginning to come to Great Britain in the fourteenth century, for there is a record to the effect that, in the year 1319, one Tomasso Loredano, merchant of Venice, shipped 100,000 pounds of sugar to London to be exchanged for wool. In that same year there is a record in an account of the chamberlain of Scotland of the payment for some sugar at the rate of one shilling nine and a half pence per pound. With money as scarce as it was in Europe at this time, it is easy to understand how the workman and the peasant, who saw almost no money from year's end to year's end, scarcely tasted sugar and still regarded it as almost beyond the dreams of hope.

It was the great age of discovery by the Portuguese and Spaniards which carried the cultivation of sugar around the world. Cane was planted in Madeira in 1420. It was carried into Santo Domingo in 1494, and early in the sixteenth century it spread to the West Indies and to other parts of South America. In the year 1700, but ten thousand tons of sugar came to Great Britain. By 1800 the amount received there had increased to one hundred and fifty thousand tons, and sugar may be said to have become an article of fairly common use.

The present sugar supply of the world is no longer dependent entirely upon the cultivation of the famous grass, the succulent stems of which are the source of cane sugar. It was a German professor, one Andreas Sigismund Marggraf, who, in 1747, at Berlin, discovered the existence of the same kind of sugar in the root of the beet and in numerous other fleshy roots which grow in temperate regions. The first beet sugar factory in the world was established by one of his pupils, Franz Carl

Achard, at Cunern, near Breslau, Silesia, in 1801. The cultivation of the beet for sugar has since spread throughout the countries of northern Europe and into the United States until more than two-fifths of all the sugar of the world, before the beginning of the great war, was the product of the beet.

The increase in the world's sugar supply has been rapid ever since sugar began to come into common use. This increase, however, has been particularly notable since the middle of the last century, and is one of the most striking developments of modern industry. The following table (a) indicates the rapidity of this increase, and the relation of beet sugar production to the total output:

Period	Total production of cane and beet sugar	Per cent. beet
	Short Tons	
1840	1,288,000	4
1850	1,568,000	14
1860	2,126,880	20
1870	2,705,920	34
Ten-year average		
1879-80 to 1888-89	4,942,896	50
1889-90 to 1898-99	7,958,228	60
Five-year average		
1899-1900 to 1903-4	12,414,200	55
1904-5 to 1908-9	15,220,000	47
1909-10 to 1913-14	18,692,950	45
Four-year average		
1914-15 to 1917-18	19,069,691	35

(a) Data from 1840 to 1870 from Encyclopedia Brittanica, 11th Edition, Volume XXVI, page 46; 1879-80 to 1898-99 from United States Statistical Abstract, 1915, page 509; 1899-1900 to 1911-12 from United States Department of Agriculture Yearbook, 1914; 1913-14 and 1914-15, same, 1916; 1915-16 to 1917-18 from Willett and Gray, *Weekly Statistical Sugar Trade Journal*, Nov. 22, 1917. Part of the data for 1916-17 and 1917-18 are estimated. Data for 1840 to 1870 are for calendar years; 1879-80 to 1898-99, fiscal years; and 1899-1900 to date, crop years. The totals from which this table was computed vary slightly for certain years from those shown for cane and beet sugar on pages 11 and 19 because of a difference in sources used. The variation is unimportant.

Cane Sugar

The sugar cane, from which more than half of the world's sugar supply is derived, is a tall, grass-like plant, growing from six to twelve or more feet in height.

Sugar cane can be grown from cuttings, or it will renew itself from the stubble by means of root stalks. Cane grown from cuttings, or seed cane, is called plant cane, while cane grown up from the stubble is called ratoon or stubble cane. How long cane is allowed to renew itself is determined by local conditions. Thus, in Java, most of the cane each year is plant cane, while in Cuba as many as twenty ratoon crops have been cut from a single planting.

The sugar cane is a native of the tropics, and cannot grow outside of a sub-tropical climate. Its cultivation has hence been associated with all the glamour and the shadow of tropical agriculture. Well into the nineteenth century, sugar and slavery in many areas had an intimate relationship. Because of climatic conditions the cultivation of sugar cane by white labor is even yet scarcely possible, and until modern tropical sanitation developed, was quite out of the question.

The increase in cane sugar production has been very rapid since 1900. The following table (a) shows the total cane sugar production of the world for each year, beginning with 1904-5:

Year	Production *Short Tons*
1904-5	7,644,568
1905-6	7,532,931
1906-7	8,349,712
1907-8	7,910,906
1908-9	8,639,792
1909-10	9,408,106
1910-11	9,736,707
1911-12	10,136,092
1912-13	10,817,125
1913-14	11,168,985
1914-15	11,355,671
1915-16	11,956,624
1916-17	12,623,084
1917-18	13,477,800

The development of tropical agriculture is a romance of modern industry, and the increase in the production of cane sugar is one of the most striking features of that story. An increase in the production of beet sugar, while to a certain degree it may represent an increase in the world's food supply, is primarily a diversion from one form of food production to another. Every additional ton of cane sugar means either the replacing of inefficient by efficient methods of culture, or the reclamation of tropical forests to the uses of man.

(a) Data from 1904-5 to 1914-15 are from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry*, page 432. Data for 1915-16 to 1917-18 are from Willett and Gray, *Weekly Statistical Sugar Trade Journal*, Nov. 22, 1917. Some figures for 1916-17 and all data for 1917-18 are estimates. The totals in this table differ slightly from the cane sugar totals which entered in the table on page 9, as the former table was compiled from different sources, in order to secure comparable data prior to 1904-5.

When the cane is nearing maturity, a modern sugar plantation under high cultivation is a striking sight. In the distance rises the sugar mill. Here and there, between the fields, tram-lines are seen, by which the cane is to be carried to the mill, while in the foreground are miles of luxuriant, green cane. Conditions surrounding sugar cane production vary greatly in the different cane sugar areas of the world. In a favorable climate, a certain yield may result with little labor, but to attain to efficient production, exacting standards must be maintained.

In Hawaii the most modern machinery is used throughout in the cultivation of cane. Much of the land is broken with steam plows, and irrigation on a scientific scale is practiced. On the other hand, the Cuban plow is often drawn by oxen. Nevertheless, the cultivation of cane involves at best a large amount of hand labor for weeding, hoeing, and so forth, and at last the heavy cane must be cut by hand, whether ox-cart, flume or tram-line finally carries it to the mill.

The principal processes involved in the manufacture of raw sugar from cane, summarized in a non-technical way, are the extraction of the juice by crushing or by diffusion, its clarification by means of lime and heat, boiling in order to concentrate the juice into syrup, crystallization of the sugar by evaporation in vacuum pans until the syrup is saturated with sugar, and the separation of the molasses from the sugar by the use of the centrifugal machine.

Cane sugar is not ordinarily refined at the point of production. It is shipped in a raw state to some point near its ultimate market. Sugar refining is a highly technical process. The raw sugar is dissolved and passes through several processes, being washed, freed of impurities, and decolorized. It is finally crystallized, dried, and becomes the refined sugar of commerce. While a number of kinds and grades of refined sugar are pro-

duced, granulated sugar now forms a large part of the output of a refinery and the total product of the smaller establishments.

As has already been noted, the production of cane sugar is widely distributed throughout the tropical areas of the world. The following table (a) indicates the chief producing areas:

Area	Average Production *Short Tons*		
	Five Years 1904-5 to 1908-9	Five Years 1909-10 to 1913-14	Four Years 1914-15 to 1917-18
Louisiana and Texas	377,279	302,647	237,690
Hawaii	470,355	569,424	619,075
Porto Rico	222,992	365,838	465,873
Philippines	141,277	252,685	333,052
Cuba	1,405,602	2,288,160	3,326,715
Java	1,223,912	1,481,382	1,645,732
Brazil	261,856	285,744	310,570
Peru	165,760	188,808	262,450
Argentina	146,275	193,851	199,902
British West Indies	162,533	131,566	174,768
British India (consumed locally)	2,244,390	2,614,258	2,905,550
Formosa and Japan	114,954	273,508	432,051
Australia	211,638	214,080	240,761
Mauritius	201,928	244,808	257,385

India has known and cultivated sugar for a very long time, and until quite recently was the foremost cane sugar producer of the world. Apparently habit helps to develop a sweet tooth, for despite its great importance as a producing area, British India does not supply its own population but is an importer, hence a liability from the standpoint of a sugar-hungry world. Cuba is now the foremost sugar producer, while British India is second and Java is third.

(a) Data for 1904-5 to 1914-15 from United States Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 432; 1915-16 to 1917-18 from Willett and Gray, *Weekly Statistical Sugar Trade Journal,* Nov. 22, 1917. All the figures for 1917-18, and part of those for 1916-17, are estimates.

Exportation, rather than production, is the test of importance from the standpoint of the present problem. The chief exporters of raw cane sugar are Cuba, Java and the insular possessions of the United States. The direction of these exports is now a lively subject of interest to the American. On the basis of an average for the three years 1914-15 to 1916-17, Cuba exported altogether 85 per cent. of her total product, and 67 per cent. of her sugar crops came to the United States.

The following table (a) summarizes the direction of Cuban exports in recent years:

Exported to	Average 1909-1913 *Short Tons*	Fiscal Year 1915-1916 *Short Tons*	Fiscal Year 1916-1917 *Short Tons*
United States	1,730,679	2,573,448	1,597,029
United Kingdom	81,633	650,177	(b)
All other countries	14,813	149,686	(b)
Total	1,827,125	3,373,311	2,222,921

It will be noted from the above figures that there was a great increase in exportations of cane sugar from Cuba to the United Kingdom during the year 1915-16. Although official data are not available for exports to that country for the last fiscal year, it is apparent on the face of the above figures that the level for 1915-16 was not maintained during 1916-17.

Java is second in importance as an exporter of sugar. She exports practically all of her sugar crop. Before the war British India was the heaviest recipient of Javan sugar. Although exports from Java to British India are still important, the United Kingdom and the continent of Europe now receive a large share of Javan sugar.

(a) Average for 1909-1913 from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, page 435, *The Cane Sugar Industry;* fiscal year 1915-1916 from "Commerce of Cuba," 1915-16, page 22; fiscal year 1916-17 from letter of Cuban Consul-General.

(b) Figures for exports to United Kingdom not available. Amount exported to countries other than the United States, 625,892 tons.

The following table (a) summarizes Javan exports to 1916-17, inclusive.

Exported to	Average 1908-9 to 1912-13 *Short Tons*	1913-14 *Short Tons*	1914-15 *Short Tons*	1915-16 *Short Tons*	1916-17 *Short Tons*
United Kingdom and Continental Europe	52,920	342	634,375	365,289	798,744
Port Said and Delaware Breakwater	320,252	....	68,496	67,360	47,337
Hong Kong	196,009	259,028	147,495	203,241	191,749
Japan	137,333	265,353	120,542	53,971	60,281
British India	459,158	683,689	377,994	511,056	491,530
Singapore, etc.	56,351	119,368	76,185	69,750	117,014
All other	108,615	97,327	34,323	71,728	42,895
Total	1,330,638	1,425,107	1,459,410	1,342,395	1,749,550

Various statements have been in circulation as to the vast quantities of sugar accumulated in Java because of the shortage of shipping. On the face of the export figures, so far as available, in comparison with Javan production as estimated for 1917-18, a carry-over of from five hundred thousand to six hundred thousand tons seems reasonable. However, estimates as high as one million tons have been made of the amount of raw sugar accumulated there. The transportation of this accumulated Javan sugar to the markets of the United States, the Entente and the neutrals would solve the sugar problem.

The insular possessions of the United States produce a large amount of sugar for export. However, practically all of the sugar produced in Hawaii and Porto Rico comes to the United States. A small amount of cane sugar is exported from the Philippine Islands to Hong Kong, China, the United Kingdom, Japan and other countries. The average of the total Philippine exports to countries other than the United States, for the five-year period

(a) Compiled from Willett and Gray, *Weekly Statistical Sugar Trade Journal*, 1908 to date.

from 1909 to 1913 inclusive, was only 65,680 tons (a) per year. Data for 1913-14 and 1914-15, while they indicated a slight increase, were not significant. Data since 1914-15 are not available, but it is believed that no important change in the direction of Philippine exports has taken place.

The war has had a marked effect, however, on the volume of exports from continental United States. It must be understood that the major portion of such exports came to the United States as raw sugar, from Cuba chiefly, and to less degree from our insular possessions.

Before the beginning of the war, the United States was quite unimportant as an exporter of refined sugar. Our average exports for the five years, 1909 to 1913 inclusive, were only 38,387 tons. During 1914 they were even lower, 25,448 tons. For the last three fiscal years, however, they have been as follows:

Year	Exports of Refined Sugar *Short Tons*
1915	274,504
1916	815,075
1917	624,420

The direction of these exports and the effect on the American situation are considered elsewhere.

(a) From U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 435.

Beet Sugar

The beet from which beet sugar is produced is closely related to the beet grown as feed for cattle and known as the mangel-wurzel.

Beet growing for sugar production "did not become important until the Napoleonic wars, when commercial restrictions cut off the importation of sugar from the West Indies. France, in particular, suffered from a shortage of sugar when the imports from the French colonies ceased, and it was then, with the personal encouragement of Napoleon, that the production of beet sugar was most in evidence." (a)

After the downfall of Napoleon, the so-called Continental System was abolished, and imported sugar was again admitted on the continent. While this proved a temporary set-back to the new industry, by 1830 it was in full swing again. The most scientific methods were adopted, both as to culture and manufacture, and new varieties of the sugar beet, high in sugar content, were developed.

"The industry was aided on the Continent by protective duties and later by the grant of direct or indirect bounties on the exportation of beet sugar." (a)

Production responded promptly. In 1840 beet sugar was but four per cent. of the total sugar product of the world. By 1870 it had become thirty-four per cent. of the total. The decade from 1879-80 to 1888-89 saw beet sugar production become half of the sugar crop,

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(a) United States Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 18.

while in the next ten years beet sugar constituted three-fifths of the world's total.

The result of the bounty system was that beet sugar could be exported by the beet sugar producing countries of the Continent at a price which threatened to ruin the cane sugar industry. The situation, after having been considered by various international conferences, was finally adjusted by the Brussels International Sugar Convention which became in force on September 1, 1903, and which is a landmark in sugar history. The convention included all of the principal countries of Europe except Russia, which came in on special terms in 1907. The convention accomplished its avowed purpose of equalizing the conditions of competition between beet and cane sugar of various countries by the abolition of indirect, as well as of direct, bounties on production and exportation of sugar, and a limitation of the rate of import duty. This latter feature "led to the dissolution of the cartels, and coupled with a reduction of the excise tax in most of the important European countries signatory of the convention, except Austria-Hungary, brought about a reduction in domestic prices of sugar, and a rise in the export prices." (a)

Return to a normal plane of competition did not put an end to the increase in beet sugar production, which was steady until the outbreak of the present war. But it did give the cane sugar industry a chance to develop, so that the proportion which beet sugar production bears to the total has declined. During the five years from 1899-1900 to 1903-4, it constituted fifty-five per cent., during the next five years it was forty-seven per cent., and in the last five years before the war, 1909-10 to 1913-14, it was forty-five per cent. of the world output.

(a) United States Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 18.

Continued increase in cane sugar production and decrease in beet sugar production as a result of war conditions have reduced beet sugar to thirty-five per cent. of the total for the four war years from 1914-15 to 1917-18.

Sugar beets in no way constitute a unique crop. They require good soil and drainage, and abundant water, either by rainfall or irrigation. The amount and kind of fertilization required depends upon the richness and quality of the soil. In the earlier stages of cultivation, the beet requires constant tending, and much of it must be by hand labor. The processes by which the sugar is extracted from the beet differ somewhat from the processes involved in the manufacture of cane sugar.

The following table (a) shows the total beet sugar production of the world for each year, beginning with 1904-5:

Year	Production *Short Tons*
1904-5	5,525,000
1905-6	8,090,000
1906-7	7,587,000
1907-8	7,390,000
1908-9	7,350,000
1909-10	6,991,000
1910-11	9,042,000
1911-12	7,072,000
1912-13	9,509,769
1913-14	9,433,783
1914-15	8,763,478
1915-16	6,848,908
1916-17	5,951,103
1917-18	5,304,880

(a) Data from 1904-5 to 1915-16 are from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 438. Data for 1916-17 and 1917-18 are from Willett and Gray, *Weekly Statistical Sugar Trade Journal,* Nov. 22, 1917. Some figures for 1916-17, and all data for 1917-18 are estimates. The totals in this table differ slightly from the beet sugar totals which entered into the table on page 9, as the former table was compiled from different sources, in order to secure comparable data prior to 1904-5.

Before the war, Germany was by far the largest beet-sugar producer, Austria-Hungary was second, Russia third, France fourth and the United States fifth. Since the war began, however, production in this country has expanded, until we are producing more sugar than France produced before the war. The following table (a) indicates the chief beet-sugar producing areas:

Area	Average Production *Short Tons*		
	Five Years 1904-5 to 1908-9	Five Years 1909-10 to 1913-14	Four Years 1914-15 to 1917-18
Germany	2,309,616	2,525,899	1,876,927
Russia	1,232,015	1,659,947	1,488,241
Austria-Hungary	1,439,238	1,651,889	1,220,686
United States	385,631	607,672	849,750
France	825,522	747,142	235,318
Netherlands	190,470	246,146	278,816
Belgium	277,257	279,918	160,200
Italy	150,080	211,050	158,625

Before the beginning of the present war, six European countries were, under normal conditions, exporters of beet sugar. In the order of importance they were: Germany, Austria-Hungary, Russia, France, Netherlands and Belgium.

Germany normally exported 37 per cent. of her total

(a) Data from 1904-5 to 1915-16 are from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry*, page 438. Data for 1916-17 and 1917-18 are from Willett and Gray, *Weekly Statistical Sugar Trade Journal*, Nov. 22, 1917. Some figures for 1916-17, and all data for 1917-18 are estimates. The totals in this table differ slightly from the beet sugar totals which entered into the table on page 19, as the former table was compiled from different sources, in order to secure comparable data prior to 1904-5.

production. The following table (a) shows the pre-war distribution of German exports:

Country	Average Exports 1909-1913 *Short Tons* (b)
United Kingdom	637,749
Norway	40,392
Switzerland	31,224
Netherlands	19,662
Uruguay	19,359
Argentina	18,121
Denmark	14,680
All other countries (c)	91,701
General Average	872,888

Austria-Hungary, before the war, exported about 51 per cent. of her output. The distribution of her exports was as follows (d):

Country	Average Exports 1909-1913 *Short Tons*
Great Britain	423,200
Turkey	123,037
British India	98,944
Switzerland	72,518
Greece	23,037
Bulgaria	16,602
Portugal	10,811
All other countries (c)	80,480
General average	848,629

(a) Compiled from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry*, page 442.

(b) Includes both raw and refined sugar.

(c) Countries shown separately which received 10,000 or more tons.

(d) Compiled from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry*, page 443. Includes both raw and refined sugar.

Russia, previous to the war, exported only about 18 per cent. of her sugar product, keeping the bulk of her crop for home consumption. Below is shown the distribution of her product for the five years from 1909 to 1913 (a):

Country	Average Exports 1909-1913 *Short Tons*
Persia	85,808
Great Britain	79,535
Finland	58,282
Turkey	41,246
Germany	13,984
All other countries (b)	14,301
General average	293,156

France was fourth in the order of importance as to beet sugar exports. She normally exported about 27 per cent. of her sugar product. The following table (c) indicates the direction of her exports prior to 1914:

Country	Average Exports 1909-1913 *Short Tons*
Great Britain	46,416
Algeria	45,041
Morocco	38,335
Switzerland	14,040
Tunis	11,419
All other countries (b)	48,926
General average	204,177

(a) Compiled from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 443. Includes both sand white and refined sugar.

(b) Countries shown separately which received 10,000 or more tons.

(c) Compiled from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 444. Includes sugar of all kinds.

France, however, imported practically an equivalent of cane sugar, so that her exports were not an actual contribution to the world supply. This point is discussed further in relation to the present French situation.

While the total exported by Netherlands was less than for the preceding countries, 81 per cent. of the total product was exported. Below is indicated the direction of Dutch sugar exports (a):

Country	Average Exports 1909-1913 *Short Tons*
United Kingdom	190,353
All other countries	7,906
General average	198,259

Belgium normally exported about 51 per cent. of her sugar crop. Its distribution was as follows (b):

Country	Average Exports 1909-1913 *Short Tons*
Great Britain	78,383
Netherlands	32,939
Persia	12,429
All other countries (c)	19,238
General average	142,989

(a) From U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry*, page 445. Includes sugar of all kinds.

(b) From U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry*, page 444. Includes sugar of all kinds.

(c) Countries shown separately which received 10,000 or more tons.

The World's Sugar Consumption

The world's sugar consumption is its sugar production; that is, although normally a considerable quantity of sugar is carried in stock in the world, consumption has expanded to keep pace with the expansion of production. Official data as to the sugar consumption of various countries are not available later than 1912-13.

Sugar consumption may be expressed as a total, or on a per capita basis. The following table (a) shows the average consumption of sugar by each of the countries now chiefly in the forefront of our interest, for the five years from 1908-9 to 1912-13. The countries are arranged in descending order, on the basis of average total consumption.

Country	Average Annual Consumption of Sugar, 1908-9 to 1912-13 *Short Tons*
United States	3,797,610
United Kingdom	2,056,529
Russia	1,322,285
Germany	1,299,585
France	704,830
Austria-Hungary	679,204
Belgium	120,558

(a) From U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 452.

The table (a) below indicates the pre-war per capita consumption for the nations included in the above table, together with data on per capita consumption for Italy, for which no average annual consumption figure is available:

Country	Per Capita Consumption of Sugar in Pounds				
	1908-9	1909-10	1910-11	1911-12	1912-13
United States	80	80	77	82	85
United Kingdom	91	86	92	86	96
Germany	44	44	48	41	49
Austria-Hungary	25	25	29	25	28
France	37	38	43	39	43
Russia	20	23	22	23	24
Belgium	33	32	38	33	39
Italy	9	9	10	10	11

The Central Powers

It would appear that whatever the situation as to the general food shortage in Germany and Austria-Hungary, there is no sugar famine. During 1916, Holland apparently received a small amount of sugar from Germany, (b), while a dispatch from Stockholm, dated December 2, 1917, (c), states that German sugar is being received there, and it is asserted that the sugar has been received without any special compensation from Sweden's resources. From the standpoint of the United States and the Entente nations, however, the fate of the Central Powers, as to their sugar supply, is of no concern; and neutral nations will presumably receive no sugar from us or our allies, until such time as we ourselves have been comfortably supplied.

Certain members of the Entente are also relatively small factors on the consumption side of the ledger. Russian production, on the basis of the estimate for 1917-18, will be 735,012 tons, or 42 per cent. below the average for the five years from 1911-12 to 1915-16, after which

(a) From U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry*, page 453.
(b) *The New York Times*, Sept. 30, 1917.
(c) *The Journal of Commerce* (New York), Dec. 3, 1917.

date the effects of war first became apparent on the Russian sugar crop. On the other hand Russia normally had exported an average of nearly 300,000 tons per year, so that elimination of her exports should enable her to get on without great difficulty.

Belgian production has been cut in half by the war. However, under normal conditions Belgium exported about 51 per cent. of her sugar, so that her present production, if it could be secured to the Belgian population, would apparently supply them. It is not unlikely that the sugar produced in Belgian territory under German occupation is at least in part diverted to German uses. Even if such be the case, however, it is hard to see how additional sugar sent to Belgium could be otherwise than an assistance to Germany.

Italy

Italian sugar consumption is very low, so that although her beet sugar product is not large, having averaged 211,050 tons for the five years from 1909-10 to 1913-14 inclusive, her annual imports for the same period averaged but 8,830 tons (a) per year. The war has greatly curtailed Italian production. As against a pre-war average of 211,050 tons, production during the war has been as follows:

Year	Annual Production *Short Tons*
1914-15	184,084
1915-16	198,414
1916-17 (Estimated)	168,000
1917-18 (Estimated)	84,000

Japan and Formosa

Cane sugar production has increased rather rapidly in Japan and Formosa, so that averages are of little value in reviewing the situation. The following table sum-

(a) From U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry*, page 449.

marizes production from 1909 to date, and imports, so far as available, for these territories:

Year	Production *Short Tons*	Imports *Short Tons*
1908-9	194,320	219,819
1909-10	291,648	148,253
1910-11	372,614	132,508
1911-12	269,797	86,943
1912-13	147,867	150,215
1913-14	285,613	359,576
1914-15	282,000	218,893
1915-16	453,854	(b)
1916-17	488,349 (a)	(b)
1917-18	504,000 (a)	(b)

The chief source of imports is the Dutch East Indies, where abundant sugar is available, so that Japan and Formosa may be said not to enter into the sugar situation.

China

Chinese imports for the five years from 1909 to 1913, including sugars of all kinds, averaged 329,364 tons per year. This amount was secured from immediately contiguous territories where there is plenty of sugar.

France

The average annual consumption of sugar in France for the five years preceding the war, 1909 to 1913, was a little over seven hundred thousand tons (704,830) per

(a) Estimate.
(b) No data available.

year. The average annual production of beet sugar in France, for the same period, was about seven hundred and fifty thousand tons (747,142). The war affected French production sharply and at once. The total outturn for each of the crop years since the outbreak of the war is given below. The table also gives the percentage of decrease in production in comparison with the average for the five pre-war years:

Crop Year	Production *Short Tons*	Percentage of decrease from average production for 1909-1913
1914-15	339,368	55
1915-16	163,552	78
1916-17 (Estimated)	203,151	73
1917-18 (Estimated)	235,200	69

It will be seen by comparison of consumption and production prior to the war that production under normal conditions ran about 40,000 tons in excess of consumption, and this excess was available for export.

France, however, was also an importer of cane sugar and, to an insignificant extent, of beet sugar. Her aver-

age annual imports, for the five years prior to the war, 1909-1913 inclusive, were as follows (a):

Kind of Sugar and Origin	Average Annual Imports 1909 to 1913 *Short Tons*
Raw Sugar	
From French Colonies	116,565
From Foreign Countries:	
Cane	34,442
Beet	6,923
Average Raw	157,930
Refined Sugar	
From Foreign Countries:	
Vergeoises (Sucre en pain)	84
Candied	927
Other	17,096
Average Refined	18,107
General Average Sugar Imports	176,037

Detailed data are not available as to the sources of that portion of French imports of cane sugar which did not come from the French colonies. For the entire five-year period from 1909 to 1913, inclusive, however, imports from the French colonies amounted to 66 per cent. of the whole.

This importation was chiefly a replacement of domestic beet by imported cane, and enabled France, during the five years prior to the war, to export an average of a little more than two hundred thousand tons (204,177) (b) of native grown beet.

(a) From France Tableau Général du Commerce et de la Navigation, 1913, Vol. I, page 87.

(b) Computed from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 444. Includes exports of raw, vergeoises and refined sugar.

France is still importing some sugar. Only general statements are available as to the amount. It is known that the French government has requisitioned the total product of "the centrals of Guadeloupe during 1917. One hundred and sixty tons (352,739 pounds), have been taken to supply the needs of the colony until February, 1918, when a new crop will be available, and the remainder, approximately 36,000 metric tons, has been taken charge of by the French government." (a)

As regards its relation to the present problem of the world's supply of sugar, the French situation may be summarized as follows:

(a) Normal French consumption prior to the war was about 700,000 tons a year.

(b) Decrease of population due to the war has not been sufficient to reduce this consumption appreciably.

(c) French pre-war sugar consumption was normally on a very moderate basis. It is estimated to have been about forty pounds per capita against eighty pounds in the United States and ninety pounds in Great Britain.

(d) Before the war French production was slightly in excess of consumption, importation being a replacement of native beet by cane sugar, and not an addition to the available supply for consumption.

(e) French beet sugar production has been reduced by the war by more than two-thirds.

(f) For the moment leaving possible importations out of consideration, it is estimated that France is, therefore, for the current crop year, short about four hundred and fifty thousand tons. In other words, if she were dependent upon home production alone, it would be necessary to cut consumption from forty pounds per capita to about fourteen pounds.

(a) U. S. Commerce Reports, October 31, 1917.

British Empire

Consumption figures for the British Empire as a whole are not available. The United Kingdom proper is, next to the United States, the greatest sugar consumer in the world. Its per capita consumption is normally somewhat higher than ours.

The United Kingdom is not a producer of sugar. Canada is an insignificant producer of beet sugar, being dependent mainly on imports for its own supplies. India, while for a long time the heaviest cane sugar producer in the world, and now second in rank, does not produce nearly enough sugar for her own people. Australia and New Zealand, although the former is a considerable producer of cane sugar, are both sugar importers. In other words, the entire British Empire consumes more sugar than it produces.

Canada

Canadian imports of sugar for the five years from 1909 to 1913, including sugar of all classes, averaged 278,669 tons (a) per year. The chief sources of this sugar were the British West Indies, British Guiana, San Domingo and the Dutch East Indies. A relatively small amount of refined sugar was imported from the United States.

India

The average annual imports of sugar of all kinds into India, for the period 1909-1913, were 648,465 tons (a).

(a) Computed from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 451.

By far the most important source was Java. Next in importance was Mauritius. The remainder of Indian importations was distributed among a number of countries.

Australia and New Zealand

The average imports into this territory for the five years from 1909 to 1913 were 141,504 (a) tons. The total was not large. A considerable part came from Java, and although the origin of the remainder was not available in the sources used for this study, it is a safe assumption that practically the entire amount was imported from the great sugar producing areas of the Malay Archipelago which lie at the doors of Australia.

United Kingdom

Prior to the restriction of sugar consumption as a war measure, the per capita consumption of sugar in the United Kingdom was about ninety pounds per year. The total average annual consumption was a little in excess of two million short tons (2,056,529). This entire consumption was met by the importation, for the five years from 1909 to 1913, of an average per year amounting to 2,031,648 tons of sugar of all kinds.

(a) Compiled from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 449.

The sources of these enormous imports prior to the war are indicated below (a):

Country	Average Imports into the United Kingdom 1909-1913 *Short Tons*	
Central Powers—		
Germany	783,171	
Austria-Hungary	319,671	
Average		1,102,842
European Members of Entente—		
France	43,642	
Belgium	77,936	
Russia (b)	79,535	
Average		201,113
European Neutrals—		
Netherlands	191,673	
Average		191,673
Other Sources—		
Java	123,401	
Peru	45,404	
Haiti and Dominican Republic	40,464	
British West Indies	39,253	
Mauritius	37,034	
Brazil	29,205	
British Guiana	24,139	
United States	23,168	
All other	173,952	
Average		536,020
General Average		2,031,648

(a) Compiled from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 450. This table is probably not statistically correct in detail, as the classification "All other" in the table from which it was drawn is not the same for refined and unrefined sugar; but it is substantially correct.

(b) Russian data from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 443. "All other" of page 450, cited above, has been reduced by the elimination of Russia.

The war began in August, 1914, and submarine warfare became a serious factor at a later date. Although the effect of the war was seen in that year in the curtailment of imports from the Central Powers, the total for the year was 2,232,206 tons, or slightly above the average for the five preceding years. The submarines, and the stress of war on the general economic life, began to show in 1915 and 1916, the total imports of sugar for these two years being respectively 1,660,238 tons, and 1,721,711 tons (a).

Although the imports for 1915 and 1916 thus show a considerable reduction below the average imports before the war, the reduction is remarkably small in view of the situation which the United Kingdom faced as regards her sugar supply. More than one million tons, out of total imports of a little over two million tons, had formerly been received from the Central Powers. These imports were entirely cut off. Likewise, practically the entire total of two hundred thousand tons formerly received from the European members of the Entente was no longer available. Imports from Netherlands were reduced from an average of about one hundred and ninety thousand tons to less than five thousand tons. The net loss represented by the elimination of these various sources of supply amounted, on the basis of the five-year pre-war average, to more than 1,450,000 tons out of total average imports of a little in excess of two million tons.

Therefore, the fact that the United Kingdom was able through other sources to bring up her total imports to 1,700,000 tons for 1916 and 1917 means that she expanded her imports of sugar from other than the above sources from somewhat more than a half million tons to one million two hundred thousand tons. The main

(a) From *Economist,* London, January 13, 1917, Trade Supplement, pages 3 and 4.

changes in the sources of her imports seem to have been a diversion of the product of Mauritius to the United Kingdom instead of to India, and a large expansion of shipments of unrefined sugar from Cuba, the Philippines and Peru. The only serious difficulty has been that the imports of refined sugar suffered heavily, the increase in shipments from the United States having only partially balanced the absence of supplies of refined sugar from Germany and Austria, and a great falling off in shipments from the Netherlands. (a)

On the face of import returns it is hard to see, at least to the close of the calendar year 1916, how the United Kingdom, which had previously averaged a per capita sugar consumption of ninety pounds per year, should have suffered any serious sugar shortage. The first interim report of the Royal Commission on Sugar states that "up to the end of 1915, the supply was maintained at a figure showing no reduction as compared with normal times, and there was nothing in the way of scarcity to cause hardship to the public. Such discomfort as there may have been was owing entirely to difficulties of distribution arising out of railway congestion and the changes in the character of importation.

"It was not until the early part of 1916 that reduction in supplies, rendered necessary by exigencies of tonnage and of exchange, became appreciable and sufficient to attract public notice. . . No serious privation would result if the domestic consumption of sugar were to be limited to three-quarters of a pound a week per head of population. To provide this allowance for the whole civil population of the United Kingdom would not require more than a weekly issue of fourteen thousand tons; but the weekly issues from the Sugar Commission have, during the period of greatest restriction, never averaged less

(a) From U. S. Commerce Reports, August 13, 1917.

than twenty-four thousand tons a week, thus leaving an ample margin for the supply of the naval and military forces, and for manufacturing purposes. 'During the greater portion of the period of the Commission's operations, it is certainly the case that, exclusive of duty, the selling price of sugar in this country has been below that of sugar in New York, notwithstanding the added cost of freight.' " (a)

The issuing of sugar cards in the United Kingdom began some time in October. The weekly allowance is expected to vary as the national stocks vary.

The United States

The following table (b) summarizes the sources of sugar consumed in the United States:

Source	Sugar Consumption *Short Tons*					
	Average 1909-1913	1913-14	1914-15	1915-16	(c) 1916-17	(c) 1917-18
Domestic:						
Cane (Louisiana and Texas)..	333,618	300,537	246,619	138,620	310,900	254,240
Beet	548,116	733,401	722,054	874,220	822,726	980,000
Total	881,734	1,033,938	968,673	1,012,840	1,133,626	1,234,240
Insular possessions: (d)						
Hawaii	543,550	557,375	640,431	568,580	581,303	(e)
Porto Rico	320,304	320,626	294,461	424,882	488,689	(e)
Philippines	112,860	58,375	163,421	108,595	133,946	(e)
Total	976,714	936,376	1,098,313	1,102,057	1,203,938	(e)
Cuba	1,721,766	2,463,303	2,392,444	2,575,425	2,334,549	(e)
Other countries ..	272,006	11,712	154,608	241,050	197,880	(e)
Total	1,993,772	2,475,015	2,547,052	2,816,475	2,532,429	(e)
Exported	54,600	48,431	300,052	832,948	624,420	(e)
Held for domestic consumption	3,797,620	4,396,898	4,313,986	4,098,424	4,245,573	(e)

(a) From U. S. Commerce Reports, October 15, 1917.

(b) Production, import and export data for 1909 to 1915-16 compiled from U. S. Bureau of Foreign and Domestic Commerce, Miscellaneous Series No. 53, *The Cane Sugar Industry,* page 446. Production data for 1916-17 and 1917-18 from Willett and Gray, *Weekly Statistical Sugar Trade Journal,* November 22, 1917. Import and export data for 1916-17 from U. S. Bureau of Foreign and Domestic Commerce, Monthly Summary of Foreign Commerce, June, 1917.

(c) Estimate.

(d) Virgin Islands included under "Other countries" because they were not a possession of the United States until 1917.

(e) Data not yet available.

The total supply available has been as follows:

Period	*Short Tons*
Average, fiscal years 1909-1913	3,852,220
1913-1914	4,445,329
1914-1915	4,614,038
1915-1916	4,931,372
1916-1917	4,869,993

It will be seen that the domestic sugar consumed averages 23 per cent., and that from our Insular Possessions 24 per cent. of the whole, leaving an average of 53 per cent. to be supplied from foreign sources.

Cuba has supplied us with about 62 per cent. of our total imports.

The following table (a) summarizes our total and per capita consumption since 1909:

Year	Total Annual consumption of all sugars in the U. S.	Total consumption for the first six months of each year	Per capita consumption
	Tons	*Tons*	*Pounds*
1909	3,648,579	.....	81.8
1910	3,752,398	1,838,845	81.6
1911	3,753,558	1,895,528	79.2
1912	3,924,684	2,032,007	81.3
1913	4,257,715	2,112,283	85.4
1914	4,212,126	2,386,830	84.29
1915	4,192,316	2,361,448	83.83
1916	4,097,640	2,394,261	79.34
1917	.....	2,650,527	81. (b)

(a) Compiled from Willett and Gray, *Weekly Statistical Sugar Trade Journal,* first January and July issues of each year.

(b) Estimate of 1917 consumption in *The New York Times,* Sept. 7, 1917.

Price Movement in the United States

The following table (a) summarizes the price movement of sugar in the United States from 1900 to date:

AVERAGE YEARLY WHOLESALE AND RETAIL PRICES AND THEIR DIFFERENCES, IN CENTS PER POUND, OF RAW AND REFINED SUGAR, 1900 TO DATE:

Years	Wholesale Prices		Difference between raw and refined granulated sugar	Granulated sugar	
	96° centrifugal raw sugar	Granulated sugar		Average retail price	Difference between wholesale and retail prices
1900	4.57	5.33	.76	6.10	.77
1901	4.04	5.05	1.01	6.00	.95
1902	3.54	4.46	.92	5.60	1.14
1903	3.72	4.64	.92	5.60	.96
1904	3.97	4.77	.80	5.90	1.13
1905	4.28	5.26	.98	6.00	.74
1906	3.69	4.52	.83	5.70	1.18
1907	3.75	4.65	.90	5.80	1.15
1908	4.06	4.94	.88	5.90	.96
1909	4.00	4.76	.76	5.90	1.14
1910	4.19	4.96	.77	6.00	1.04
1911	4.46	5.33	.87	6.10	.77
1912	4.16	5.05	.89	6.30	1.25
1913	3.50	4.27	.77	5.50	1.23
1914	3.84	4.71	.87	5.90	1.19
1915	4.65	5.56	.91	6.60	1.04
1916	5.79	6.88	1.09	8.00	1.12
1917—					
January ..	5.24	6.62	1.38	8.00	1.38
February .	5.17	6.86	1.69	8.10	1.24
March	5.48	7.06	1.58	8.70	1.64
April	6.21	8.14	1.93	9.60	1.46
May	6.08	7.94	1.86	10.00	2.06
June	6.04	7.54	1.50	9.30	1.76
July	6.62	7.45	.83	9.10	1.65
August ...	7.27	8.18	.91	9.90	1.72
September	6.96	8.23	1.27	9.80	1.57
October ...	6.90	8.18	1.28	9.70	1.52

(a) Compiled from bulletins of the U. S. Bureau of Labor Statistics, except for 1917, which was furnished in manuscript by that Bureau.

Exports of Refined Sugar of Domestic origin from the United States in Relation to the War

As elsewhere noted, our exports of refined sugar have expanded as a result of the war. Prior to its beginning, we exported but 1.4 per cent. of our available supply. During the fiscal year 1914-15 we exported 6.5 per cent., but in 1916-17 we exported one-eighth, or 12.8 per cent. The following table (a) makes clear the effects of the war on our exports of refined sugar:

EXPORTS OF REFINED SUGAR FROM THE UNITED STATES FOR EACH YEAR FROM 1909 TO 1917 INCLUSIVE, IN SHORT TONS (b).

[Those countries are shown separately which received exports amounting to 25,000 or more tons during any one year of the period covered. The relatively large amount shown at "All other" is distributed among more than fifty countries, the amount sent to each being too small to justify showing separately.]

Country	1909	1910	1911	1912	1913	1914	1915	1916	1917
United Kingdom	21,061	51,071	13,735	26,620	258	757	213,422	466,229	(c)
France	.....	.....	.....	.....	.....	.....	120,088	175,148	(c)
Norway	.....	.....	4	.....	3	.....	732	48,132	(c)
All other	18,882	11,645	13,735	13,177	21,736	24,691	21,262	125,566	(c)
Total	39,943	62,716	27,474	39,797	21,997	25,448	274,504	815,075	624,420

Our exports to the United Kingdom expanded from an average of 22,549 tons for the five years from 1909 to 1913 to 132,422 tons during the fiscal year 1914-15, and 466,229 tons during 1915-16.

Our exports to France, nothing prior to 1914-15, were 120,088 tons in that twelve-month period, and 175,148 tons in 1915-16.

(a) This table includes both cane and beet sugar.

(b) Compiled from United States Bureau of Foreign and Domestic Commerce, Commerce and Navigation of the United States, and Monthly Summary of Foreign Commerce, June, 1917.

(c) Total only available.

Detailed data, by countries, are not available for the year ending June 30, 1917, but a total of 624,420 tons of refined sugar was reported during that fiscal year. Exports of domestic refined sugar, so far as available for the current year, are as follows (a):

Country	1917		
	July *Short Tons*	August *Short Tons*	September *Short Tons*
France	16,395	23,578	12,204
Italy	4,372	161	617
Norway	5,974	595	50
Spain	609	2,292	597
United Kingdom	262	20,149	164
Mexico	649	2,316	1,441
Argentina	16,258	18,293	9,176
Uruguay	812	5,905	3,811
Other Countries	1,473	5,111	3,627
Total	46,804	78,400	31,687

(a) Compiled from U. S. Bureau of Foreign and Domestic Commerce, Monthly Summary of Foreign Commerce.

The United States Food Administration and the Sugar Situation (a)

Cuban sugar is the dominant factor in the American sugar market. Domestic production is too small to control it. Owing to the competition of foreign buyers in the Cuban market, the price of Cuban sugar advanced rapidly from June to August, 1917. By that time there was very little left of the old crop in Cuba. To relieve the situation, the Food Administration, by means of two conferences, secured a voluntary agreement accepted by the whole of the beet sugar industry of the country, by which the sale and distribution of the entire beet sugar product of the United States was placed in the hands of the Food Administration, to be sold at a price not exceeding 7.25c. cane basis Seaboard Refining points. Voluntary agreements have also made it possible to adjust the cane sugar price for the western half of the United States on the same basis. Very recently the Food Administration announced an advance of ten cents per hundred pounds in the price of beet sugar. The new price of 7.35c. per pound took effect on December 12.

On September 21 the International Sugar Committee was formed. It consists of five members, two of them, Sir Joseph White-Todd and John V. Drake, Sr., appointed by the Allied Governments, the other three being Earl D. Babst, the president of the American Sugar Refining Company; W. A. Jamison, of Arbuckle Brothers, and George M. Rolph, head of the Sugar Division of the Food Administration. It is the duty of this committee to arrange for the purchase and distribution of all sugar, whether for the United States or the Allied countries.

(a) The above summary was adopted from statements issued by the United States Food Administration, published in the *Official Bulletin* of September 18, Volume I, No. 110, and later issues.

The three American members serve as a sub-committee to handle and decide purely domestic questions with which the Allied members are not concerned.

An American Refiners' Committee has also been appointed to co-operate with the International Sugar Committee, with the idea of assisting in the distribution of the refined product. This committee has also had charge of distributing the so-called neutral and Russian sugars, commandeered for consumption in the eastern part of the United States, as well as the refined beet sugar.

Conferences held in Washington and New York between representatives of the entire sugar refining industry of this country and the Food Administration, have resulted in a voluntary agreement for the duration of the war. Refiners will undertake not only to obtain their supplies of raw sugar under the direction of the International Sugar Committee, but they also have agreed to work at a stipulated margin between the cost of raw sugar and the selling price of refined, thus limiting profits and going a long way towards stabilizing prices and eliminating speculation. The refiners have agreed to refine sugar at a net margin between the cost of their raw material and the selling price of their refined product of approximately 1.30c. per pound, after trade discounts have been deducted. The basis for this margin had its origin in the five-year pre-war period. Owing to increased costs, although the margin is slightly higher than the average for the five pre-war years, the actual net margin of profit left to the refiners is about the same as the pre-war basis.

The Food Administration entered into negotiations with the Cuban Government and the Cuban planters, and on November 30th "an agreement in regard to the purchase and sale basis price of Cuban sugars for the coming crop year was arrived at, the figure being 4.90c. cost and freight, based on .30c. freight rate, which reflects an equivalent of about 4.60c. f. o. b. Cuba. The actual price of

the sugar at New York can only be determined after the United States Shipping Board has announced the rate of freight, which point, it is hoped, will be settled within a very few days." (a) A number of Cuban centrals have already started grinding, and sugar will be shipped as rapidly as transportation for it can be provided.

This co-operative buying between the refiners, and the purchasing of raw supplies for England, France, Italy and Canada, with the resultant elimination of competitive buying, is expected to save consumers a great deal and to prevent rapid fluctuations in price.

(a) As announced in the *Journal of Commerce* (New York), Dec. 1, 1917.

Summary of the Sugar Situation

The present shortage in the sugar supply is temporary and will be relieved as soon as the new crop begins to arrive. The crops for each of the three years since the war has been in full swing, 1915-16, 1916-17 and 1917-18 (estimated), approximate the average for the five years preceding the war—in round numbers, 18,500,000 tons. It is true that this figure represents a decline of about 2,000,000 tons below the average production for the three crop years 1912-13, 1913-14, and 1914-15. However, these were record-breaking years, representing the world's maximum production.

Beet sugar production has been heavily curtailed by war conditions, but cane sugar production has increased by more than two million tons since the outbreak of the war, thus partially offsetting the loss. The cane sugar supply is all at the disposal of the United States, the Entente and the neutrals. The question as to whether the Central Powers have sufficient sugar or not is of no interest to the United States. It is to be assumed, also, that the neutrals will not be supplied until the United States and her Allies have all the sugar that they need.

The situation varies among the different countries of the Entente. Russia and Italy are both somewhat short of sugar. Russia, however, is not sufficiently in need to become a drain on the available supply, and Italy is such a small consumer of sugar that to make up her deficit is a small matter. France, however, is very short of sugar. On the basis of a normal consumption of seven hundred thousand tons, she is short two hundred thousand tons, and as the French people were not, under peace conditions, abnormally high consumers of sugar, their deficit must be made up. British per capita consumption

normally was so high that the British can stand a reduction. Imports to that country, to the close of 1916, were approximately three hundred thousand tons below the normal. No British import data are available after that date. Sugar consumption in that country, however, is under rigorous restrictions.

Great Britain has been able to maintain a relatively high import figure by the change in the direction of her importations. When her beet sugar imports were practically cut off, she increased her shipments from Cuba and the Philippines. This affects our supplies as sharply as though the sugar went directly from our own shores. She has also been able to increase her imports from Mauritius and Peru, and these increased shipments in no wise affect us.

The problem for the United States is only a part of the world problem. The United Kingdom and France must have a reasonable supply of sugar, not because sugar is necessary to life or comfort, but because it is a form of food which can rapidly be converted into energy and is therefore especially valuable for soldiers and for workers engaged in hard manual labor, such as ship building and the manufacture of munitions.

We are heavy consumers of sugar, our per capita figure being second only to that of the United Kingdom. Although beet sugar production is increasing in the United States, it is not very likely to expand fast enough, especially in the face of a regulated price, to be much more of a factor in the situation than it is at present. Our entry into the war has necessarily resulted in much disturbance of our shipping. The effect which the shipping situation may have on our imports from the Philippines and from Cuba is not yet to be estimated.

The accumulation of sugar in Java is an interesting feature in the situation. The most conservative estimates are to the effect that from five hundred thousand to six

hundred thousand tons of sugar are stored there because of the lack of shipping facilities. This quantity would amply supply all needs, but at present it cannot be transported to the United States, Great Britain or France. Reports have been circulated to the effect that the Javan movement to the United Kingdom is satisfactory, but these rumors are not well confirmed.

Even without this Javan sugar, however, there is enough cane sugar available for the Entente and for the neutrals, if the crop in Cuba and other convenient cane producing areas can be shipped and distributed intelligently. The Food Administration has undertaken to deal with the situation. Governmental price control and distribution can be effective. The British government has succeeded so well in the case of sugar that the Royal Sugar Commission was able to say in its first report (a):

"During the greater portion of the period of the Commission's operations it is certainly the case that, exclusive of duty, the selling price of sugar in this country (England) has been below that of sugar in New York, notwithstanding the added cost of freight."

It is true that the present sugar shortage is but temporary, and that as soon as the new crop begins to come into the market, the supply again will be quite adequate to our needs. At the same time, sugar is a valuable food which must be carefully conserved. Even when it again becomes available in normal quantities, it must be wisely used. No waste can be tolerated.

(a) U. S. Commerce Reports, No. 241, Oct. 15, 1917.

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November 20, 1917

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U. S. Certificates of Indebtedness	203,895,000.00
U. S. Liberty Bonds	13,182,448.00
Other Bonds, Securities, etc.	24,362,772.27
U. S. and Other Bonds Borrowed	37,961,300.00
Banking House	2,000,000.00
Due from Banks and Bankers	16,321,462.21
Cash, Exchanges and due from Federal Reserve Bank	87,002,171.88
Customers' Liability under Letters of Credit & Acceptances	31,622,528.89
Interest Accrued	1,049,967.01
	$710,681,713.42

LIABILITIES

Capital, Surplus and Undivided Profits	$45,889,447.03
Deposits, including those of U. S. Government	562,566,114.15
U. S. and Other Bonds Borrowed	37,961,300.00
Letters of Credit and Acceptances	31,911,925.34
Bills Payable with Federal Reserve Bank	27,000,000.00
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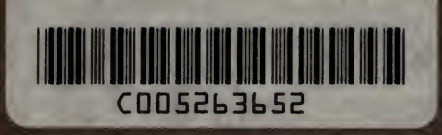
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